

here talking about this, over the last couple of years is, if M. King Hubbert was right about the United States, why shouldn't he be right about the world? And why shouldn't we have been paying some attention to this?

I was interested in this subject probably 40 years ago. I knew that oil couldn't be forever. I mean, you know, the Earth isn't made out of oil; it's not going to last forever. At that time I had no idea how long it would be before we had to start being concerned about oil. Was it next year, 10 years, 100 years, 1,000 years? But I knew at some time we would need to be concerned about oil. Apparently, that time has come.

Well, the solid black line here indicates our consumption of oil. It also represents our production of oil, because there's no big stockpile of oil somewhere unused, so what we produce is what we use. So it's either the consumption curve or the production curve.

If we were to put a smooth curve over these discoveries, and there we have little bars for each year, it's obvious that what you've done is to add up all of the discoveries year by year. So the area under that curve, for the person who doesn't understand what integration is, the area under that curve represents the total amount of oil we've found; so much this year and this year and this year. And the area under the curve adds them all up.

Now, the area under this black curve here is going to indicate how much oil we use. Now, it's really obvious that you can't use oil that you haven't found. So the area under the consumption curve is going to have to be the same thing as the area under the discovery curve.

But look at what's been happening to discovery since, what, before 1970. It's been down, down, down, down, down, down. The lightly shaded part of this graph to the right is just a guess as to what's going to happen in the future, but an absolute certainty is that you're not going to pump oil that you haven't found.

Now, ever since the 1980s here, we have been pumping more oil than we've found, so this area here now has consumed reserves that we found in the past. So we have all this amount of reserves that we can use in the future. That represents the area under this curve.

They're predicting here that we will have ever less and less discovery. It won't be that nice smooth curve. It will be up and down. But on the average, that's what it should be because that's what it's been.

And by the way, for the past 20 years or so we have had incredibly improved techniques for finding oil. So for those of who tell you not to worry, it's out there, where? We've been scouring the world for the last 20 years with computer modeling and 3-D seismic, and our discovery has been down, down, down. And these people are wisely pro-

jecting that's probably what it's going to do for the future.

There's another chart here, and this is another chart from CEERA, Cambridge Energy Research Associates. And they are predicting that we're going to find two and three times as much more oil as all the recoverable reserves that we now know are there. And even if that is true, it moves the peak out only a relatively few years. This is the curve, if we don't find any more than that previous chart showed.

Most of the experts in the world believe that the total amount of oil that we have pumped and will pump is somewhere in the category of 2 trillion barrels. We've pumped about a trillion, we have about another trillion to pump, more or less. So the peak, if that is so, is imminent, isn't it?

If we find 2.93 total, wow, that's another trillion barrels of oil. It pushes out only that far. And they say we're going to add some unconventional oil. That we will. And so they, and this was in an article that was debunking peak oil, and this was a major chart in that article and, by golly, it shows a peak. They say it will be an undulating plateau. I agree. I don't agree that it's going to be out there another 50 years, but I agree that it's going to be an undulating plateau.

The next chart is an interesting little exercise. And this is from EIA, our Energy Information Agency, which, by the way, does a really good job of tracking the use of energy. And it has done a pretty poor job of projecting how much energy we're going to find, because this was their projection. These are the discoveries of oil.

Remember that previous bar chart? These are the big spikes, the discoveries of oil. And they, really misinterpreting some data from USGS, predicted three different possible paths here. There was an F for frequency in the USGS data, and somehow that got translated to P for probability when it came to this chart. I have no idea how you'd do that, and I have had a course in statistics, so I understand a little about that.

But they said that the 50 percent probability was the mean and that that is the most probable thing that would happen. Therefore, the discoveries of oil were going to go up.

This is the 95 percent probability. If it's truly a probability, obviously, if you're 95 percent more certain than 50 percent, and this is the 5 percent; by the way, there should be another green line here and another blue line here because it's a little bit like the path of the hurricane. It's pretty tight today, but where it's going to be a week from now you're less certain, so it kind of fans out. So that's what these 50 percent and 5 percent represent.

But notice where the actual data points have been. The actual data point have, as one might suspect, followed the 95 percent probability because 95 percent probable is more probable than 50 percent probable.

The next chart is a chart from a report and I'm going to mention in just a moment four major studies that have been done, and I have a number of quotes from those. Because what I'm saying today is based on not just my perception of what's going on, but the reality as indicated in these four different studies.

This is EIA projections. And if we found as much more oil as all the known reserves of oil today, that is going from roughly the 2 trillion to 3 trillion barrels of oil. That will push the peak out only from here to 2016.

And this shows another interesting thing. If we get really good at enhanced oil recovery, and we drill a lot of wells and we suck it out faster, we might move the peak over to 2037. Then you fall off a cliff; because you can't pump what's not there.

Now, enhanced oil recovery will get a little more, but it may get it a lot faster. There will be some additional oil pumped from enhanced oil recovery, but it will not be a huge amount.

Now, I want to go through a number of quotes from five different sources actually. One of those is a very famous speech given by Hyman Rickover, the father of our nuclear submarine. He gave this speech 50 years ago, the 14th day of this May, in St. Paul, Minnesota, to a group of physicians. He was incredibly prophetic in that speech. There's a link on our Web site to that that you can simple do a Google search for Rickover and energy, and this speech will pop up. I will tell you, it is the most interesting speech that I have ever read. You'll be fascinated by it.

Just a quote from this speech: "Whether this golden age," and boy is this a golden age, and he notes in this speech, by the way, that the amount of energy that we have available to us represents a huge amount of people working for us. The energy in a single barrel of oil represents the work of 12 people working all year.

When I first saw that, I said, it can't be. But then I thought of how far that gallon of gasoline or diesel, by the way, still cheaper than water in the grocery store, how far that takes my Prius, I drive a Prius, takes my Prius nearly 50 miles. How long would it take me to pull my Prius 5 miles? I could do it. If it was on the level, I might strain and do it very slowly. If it was uphill, I'd have to have you come along to do it. But how long would it take me to pull my Prius 50 miles? An incredible amount of energy. This is indeed a golden age, this age of oil.

He noted that every housewife 50 years ago had available to her the work equivalent of 34, I think he said, faithful household servants. I think it was 700 manpower efforts push your airplane through the sky, and 100,000 the train down the track and so forth.

"Whether this golden age will continue depends entirely upon our ability to keep energy supplies in balance with the needs of our growing population.